

IN THE CLAIMS

1. (Amended) A method of analyzing a medical images to use a CAD system to detect anatomical abnormalities obtained from one of a plurality of original sources, the method comprising:

providing a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first of said original sources;

defining a canonical contrast response curve based on the training image set and the first original source;

normalizing each medical image such that each medical image conforms to a the canonical contrast response curve for image analysis regardless of the original source of the medical image; and

numerically processing each of the normalized medical images using the CAD system to identify anatomical abnormalities therein.

2. (Amended) The method of claim 1, wherein the ~~medical image is in a DICOM format for flexibility in communication with devices~~ normalizing for each medical image comprises:

identifying which of the plurality of original sources was used to capture that medical image; and

remapping pixel values of that medical image in accordance with a predefined remapping process associated with said canonical contrast response curve and said identified original source.

3. (Amended) The method of claim 2, ~~further comprising: converting wherein~~ the medical image is in to a DICOM format, and wherein identifying the original source comprises reading a DICOM header associated with the medical image.

4. (Original) The method of claim 1, further comprising:
detecting what anatomical feature is represented by the image; and
processing the image to detect abnormalities in the anatomical feature, in
accordance with a detection process for that anatomical feature.

5. (Original) The method of claim 4, wherein detecting what anatomical feature is represented uses a header present in a DICOM format of the image.

6. (Previously Presented) The method of claim 1, further comprising:
generating a new tone scale for the medical image for optimal visualization of
abnormalities in dense anatomic regions.

7. (Currently Amended) An apparatus to improve medical imaging
comprising:

a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first of said original sources;

an image analysis system to define a canonical contrast response curve based on the training image set and the first original source, the image analysis system further to normalize a medical image to conform to the~~create~~a canonical contrast response curve regardless of an original format of the image[[,]]; and

the CAD system further to process the normalized medical image to identify anatomical abnormalities therein, thereby permitting a single analysis algorithm to be used on all images regardless of original source.

8. (Previously Presented) The apparatus of claim 7, further comprising:
an image acquisition module to acquire a medical image from one of a plurality of sources.

9. (Original) The apparatus of claim 8, wherein the image acquisition module is coupled to the image analysis system through a network.

10. (Original) The apparatus of claim 7, further comprising:
a review station to allow medical personnel to review the medical image after analysis.

11. (Original) The apparatus of claim 10, wherein the review station is coupled to the image analysis system through a network.

12. (Original) The apparatus of claim 11, wherein the review station comprises:

a user interface permitting the reviewer to manipulate the contrast and windowing of the image.

13. (Original) The apparatus of claim 11, further comprising:
marker focus system to permit a reviewer to automatically move from marked location to marked location on the medical image, wherein each marked location corresponds to an abnormality detected by an abnormality detection system.

14. (Original) The apparatus of claim 7, further comprising:
a system archive to store the medical images, including historical images of past procedures.

15. (Original) The apparatus of claim 7, wherein the image analysis system further comprises a pre-processing module.

16. (Previously Presented) The apparatus of claim 15, wherein the pre-processing module comprises a pixel size adjustor to adjust a number of pixels per square inch to a standard value.

17. (Original) The apparatus of claim 15, wherein the pre-processing module comprises a segmentation logic to segment the medical image.

18. (Original) The apparatus of claim 7, wherein the image analysis system further comprises a post-processing module.

19. (Original) The apparatus of claim 18, wherein the post-processing module includes a tone scale generator to adjust a tone scale to optimize viewing of dense portions of the medical image.

20. (Currently Amended) A system comprising:
a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first source;

a source of image data, each image in the image data having one of a multiplicity of spatial resolutions and a multiplicity of contrast responses;

a preprocessing module to normalize the image by transforming the image data into a “canonical” forms with uniform contrast response, overall level and pixel size, the canonical form based on the training image set and the first source;

such that the image analyzed by a computer aided diagnosis system has a uniform contrast response regardless of the original source of the image.

the CAD further to numerically process each of the normalized images to identify anatomical abnormalities therein.

21. (Previously Presented) The system of claim 20, further comprising:
a post-processing module to modifying a contrast response curve of the image to improve visibility of suspicious regions.

22. (Original) The system of claim 20, further comprising:
a CAD module to process said data to detect abnormal anatomical features meeting selected criteria.

23. (Original) The system of claim 22, further comprising:
a display to selectively display annotation maps at positions corresponding to suspicious regions around the abnormal anatomical features detected by the CAD module.

24. (Original) The system of claim 20, further comprising:
a remote display to permit access to the processed image via a network.

25. (Original) The system of claim 20, further comprising:
a network coupled to the system, the network permitting a distribution of processing to multiple computing devices.

20. (Currently Amended) A system comprising:

a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first source;

a source of image data, each image in the image data having one of a multiplicity of spatial resolutions and a multiplicity of contrast responses;

a preprocessing module to normalize the image by transforming the image data into a “canonical” forms with uniform contrast response, overall level and pixel size, the canonical form based on the training image set and the first source;

such that the image analyzed by a computer aided diagnosis system has a uniform contrast response regardless of the original source of the image.

the CAD further to numerically process each of the normalized images to identify anatomical abnormalities therein.

26. (Currently Amended) A system comprising:

a source of image data;

a preprocessing module transforming the medical image into a “canonical” form with a universal contrast response, overall level, and pixel size, such that the contrast response of the medical image is the same as other medical images in said canonical form;

a computer-aided detection (CAD) module to process the image data to detect abnormal anatomical features meeting selected criteria and to flag the abnormal anatomical features as suspicious regions;

a post-processing module to modify a contrast response curve of the image to increase visibility of the suspicious regions.

27. (Previously Presented) The system of claim 26, further comprising:
a window generation logic to open a separate window on a display to display a suspicious region; and
the post-processing module optimizing the contrast response curve for the separate window.

28. (Previously Presented) A system comprising:
a source of medical images, each image having one of a multiplicity of spatial resolutions and one of a multiplicity of contrast responses;
a preprocessing module transforming the medical image into a "canonical" form with a uniform contrast response, overall level, and pixel size;
a CAD module to process the medical image to detect abnormal anatomical features meeting selected criteria and to generate annotation maps identifying image portions corresponding to said abnormal anatomical features;
a post-processing module to modify a contrast response curve of the image to increase visibility of suspicious regions associated with the abnormal anatomical features; and

a display to selectively display annotation maps at positions corresponding to suspicious regions.

29. (Original) The system of claim 28, wherein the CAD module is further to generate a DICOM CAD SR object.

30. (Original) The system of claim 29, wherein the CAD module is further to send the DICOM CAD SR object to the network.

31. (Original) The system of claim 29, wherein the DICOM CAD SR object is used by the display to display the annotation map.